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Macroeconomic Indicators of National Subjective Well-being

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Abstract

Subjective well-being (SWB), the self-reported evaluation that people's lives are enjoyable and proceeding well (Diener et al., 2015), has been gaining attention in the study of macroeconomics as a useful indicator to assess quality of life within a country. In the literature, socioeconomic factors ranging from income level to perceived corruption to inflation have been found to have a relationship with national SWB. This study analyzes the research that has been done on macroeconomic indicators that have been linked to national SWB and provides context to evolution of interest toward national SWB in economics. This study also attempts to identify statistically significant variables of SWB by conducting a multiple regression analysis for a sample of 90 countries for the year 2017.

Introduction

Subjective well-being (SWB) is defined as how people evaluate the degree to which their lives are desirable and proceeding well (Diener et al., 2015). This concept is closely tied with life satisfaction, which can be described as a subjective indicator that measures how people evaluate their lives (OECD, 2019). In more colloquial terms, SWB is parallel to happiness, or "a state of well-being and contentment," (Merriam-Webster, n.d.). For the purposes of this paper, SWB, life satisfaction, and happiness will be used interchangeably, as the research done on the topic includes all these relevant terms and measures the same construct.

Academic research on SWB and happiness has been traditionally rooted in psychological and sociological theory in support of the biopsychosocial paradigm. Following the social constructivist ideology, happiness is defined as a construct that represents an individual's subjective reality in an objective world and is determined in large part by comparative thinking (Stavrova, 2019). It consists of two aspects – cognition and affect. In other words, people's evaluation of their lives is partly made up of their mood or emotions (affect) and partly by thinking processes including comparative judgement (cognition). As outlined in *The Oxford Handbook of Happiness* (2013), multiple psychological theories have been applied to happiness, from broadened attention theory, to the Endowment-Construct model, to emotional intelligence. However, these theories are often only applied to individual SWB, and do not apply to an understanding or model to predict national SWB.

Economists have defined SWB as measure of utility. As Frey and Stutzer (2002) explain, "People evaluate their level of SWB with regard to circumstances and comparisons to other persons, past experience, and expectations of the future". Historically, economists used objective indictors, most notably GDP, to assess country well-being. However, the old belief that wealth

was the best indicator for quality of life within a country was challenged by findings from Richard Easterlin in 1974. In what is now coined the “Easterlin paradox”, his research showed that though there is a positive relationship between income and country happiness, overall levels of happiness do not increase even as national wealth rises over time, meaning there had to be other factors at play (David & Ayers, 2013). Since then, more attention and research in economics have been focused on what factors best predict country-level SWB to compare quality of life more accurately within and between countries and inform policy makers’ decision-making.

Research into SWB in economics is still a relatively new and evolving area of study. Several socioeconomic factors have been cited as key variables affecting country SWB through peer reviewed research. To name a few, national wealth, unemployment, cultural dimensions, and institutional effects have all be identified as factors that are correlated with life satisfaction. In addition, nations with high levels of SWB are typically characterized as societies with strong rule of law, low corruption, efficient government, high political freedom, and cleaner natural environments. Robust national welfare protections like income security programs (pensions, unemployment benefits, aid for the ill and disabled), active public employment policy, and healthcare benefits are typically seen in high-scoring SWB countries, as exhibited by Scandinavia (Diener et al., 2015).

The goal of this study was to form a model for predicting national SWB using a cross-sectional sample of countries. Using a multiple regression analysis, this study was intended to determine the statistical significance of independent variables often cited in literature on the subject while also including income inequality, a factor that has had very little cross-national research done on its relationship with national SWB. In support of the belief that wealth is not

the best indicator of the quality of life in a country, I hypothesize that my study will reveal a statistically significant relationship between income level and other economic factors on national SWB.

Literature Review

Psychological Perspective of SWB

Psychologists point to both personality, goal seeking behavior, and sociodemographic factors as being the main predictors of happiness (Stavrova, 2019). A study on happiness as a function of the Big Five personality traits found that 50% of happiness variance can be attributed to personality traits. For example, people who score higher on neuroticism are the least happy. These results support the top-down theory of happiness that says that individuals' predispositions and genetics determine a "set point" of happiness for that individual that may vary in short time periods but is ultimately stable over the lifetime (Stavrova, 2019). Top-down effects affect cognition by processing memories through a lens of personality and individual perspective, rather than what really happened, which can also be a factor in evaluation life satisfaction (Diener et al., 2013). Culture influences sources of SWB by affecting aspects people's traits. For example, people living in individualistic cultures tend to put more emphasis on reaching goals relating to their self-esteem than people living in collectivist cultures (Diener et al., 2013). Another study found that individualist cultures remembered more autobiographical memories that made them proud rather than those that made them ashamed, while collectivist cultures showed no difference in remembering. Therefore, through top-down effects, researchers predicted that individuals that score high on valuing individuality are more likely to report higher levels of SWB, as they look back on their life with more positive memories (Stavrova, 2019).

To obtain their needs, as demonstrated by Maslow's Hierarchy of Needs, people must satisfy the lowest level of survival before pursuing a state of happiness or self-actualization. It is human nature to constantly stive for higher goals, starting with physiological needs, like food and shelter. After these more basic needs can be met, individuals may move up the pyramid until they reach the top, pursuing goals of self-actualization, like a sense of purpose and happiness. 40% of variance in happiness level can be attributed to goal-seeking activity. For example, attempting more prosocial behavior, which meets social needs in the hierarchy, is associated with higher levels of SWB. In addition, reported levels of high self-esteem is corelated with higher levels of life satisfaction (Stavrova, 2019).

Lastly, sociodemographic factors such as job status, income, and marital status explain 10% of variance in levels of SWB (Stavrova, 2019). Results from the Gallup World Poll have uncovered some interesting patterns about sociodemographic factors and life satisfaction. A full-time job, higher education level, and higher income increases the likelihood of higher life satisfaction. Though men and women report similar levels of life satisfaction, there are more obvious gender gaps in happiness levels in countries like Italy, the UK, Japan, and Korea. Regarding age, life satisfaction seems to decrease over the lifespan. Findings also show that the place where one lives (urban versus rural) does not seem to influence life satisfaction (OECD, 2019).

Stavrova (2019) points to two theories that explain how individual's traits predict their assessment of SWB. These traits include personality, behavior, and sociodemographics. The first theory is the institutional hypothesis that states that individuals' characteristics contribute to happiness to the extent that macro level conditions are favorable to individuals with these characteristics. For example, unemployed people are happier in countries with more

unemployment benefits. Those with ill health were happier in places where there was more investment in the healthcare system. Women were more satisfied in countries with less gender inequality. The second theory is known as the fit hypothesis, which says individuals' characteristics contribute to SWB to the degree which these characteristics are widespread and socially desirable. This hypothesis is explained by psychological theories on normative conformity, social sanctions, and person-environment fit. For example, people who practice the most popular religion in the country would be more likely to experience higher levels of SWB than people who practice the minority religion (Stavrova, 2019)

SWB in Economics

We think of SWB indicators in an economic context as being a relatively modern concept, but hundreds of years ago, the 18th century English philosopher Jeremy Bentham outlined a model of utility derived from how much happiness is produced during any action. He proposed that utility could be measured based on a happiness calculus that consisted of a balancing between 12 pains (i.e., pain of the senses) and 14 pleasures (i.e., pleasures of wealth). However, his theory was never widely accepted, and economists focused more on what people were willing to spend money on, rather than how much happiness it brought them to assess utility. Consequently, measures of income were adopted as the best measure of country well-being, with GNP and GDP becoming the key economic indicators of growth and development adopted by the IMF and World Bank upon their conception (Fox, 2012).

In 1974, the economist Richard Easterlin brought to attention that fact that income does not predict happiness as well as what was previously thought. The Easterlin Paradox was born out of his research that found national happiness polls did not correlate strongly with per capita income (Fox, 2012). Since WWII, income has risen in Western countries by 2.5 on average but

happiness has remained constant (Frey & Stutzer, 2002). Also, countries of similar per capita income have consistently experienced different levels of life satisfaction. For instance, the Scandinavian countries consistently place in the top ten of average life satisfaction score, while the United States finished 18th highest in the world on life satisfaction (OECD Better Life Index, 2020). Both findings are evidence that looking at country wealth alone is not an accurate representation of well-being and there are other factors that affect national SWB that may be influenced by institutional and policy changes.

In 1968, Robert F. Kennedy voiced his critiques on using only at country wealth when judging the well-being of a society and brought SWB into the national econometrics discourse. He famously said, "Our gross national product…counts air pollution and cigarette advertising and ambulances to clear our highways of carnage. It counts special locks for our doors and the jails for the people who break them. It counts the destruction of the redwood and the loss of our natural wonder in chaotic sprawl.…Yet the gross national product does not allow for the health of our children, the quality of their education, or the joy of their play," (Diener et al., 2015). Since the 1970s, SWB has been slowly gaining acceptance as being a legitimate and holistic valuation of national well-being. A prominent researcher in SWB proposed that all countries should adopt national accounts of SWB to reflect the summative measure of quality of life within their country. At a conference at the University of Pennsylvania, 50 economists and psychologists signed off on his guidelines (Diener et al., 2002). In 2015, the Prime Minster of the United Kingdom announced that they would consider measures of SWB when creating policy, echoing the values of Robert F. Kennedy 50 years later.

The first systematic study of SWB began in 1970 when the European Commission started to conduct a survey, the Eurobarometer, to gauge matter of public opinion within the EU. It

continues today and is used as a tool to inform public policy decisions. The success of these assessments and subsequent academic publications that vouched for the reliability of measuring SWB led to more large-scale surveys that directly asked for self-reported life satisfaction including the World Values Survey (1981), the International Social Survey Programme (1984), the Latinobarometer (1995), and the Afrobarometer (1999), (Cummins et al., 2009). More recently, the Organisation for Economic Cooperation and Development launched is Better Life Initiative, which attempts to capture data on country-level well-being completely through its international "How's Life?" surveys. Recognizing that there still fails to be a consensus on how population-level SWB should be measured, the OECD published "OECD Guidelines of Measuring Subjective Well-being" that provides recommendations on collecting, publishing, and analyzing SWB data (OECD, 2013). The scope of SWB is far-reaching and has been assessed by the Gallup World Poll in more than 165 societies around the world and published in the annual *World Happiness Report* (Diener et al., 2015).

Income level

Research has shown that people with higher incomes are generally happier than those with low incomes. Higher income allows for more basic material needs to be satisfied, thus it has greater utility than lower income. Controlling for the exchange rate and PPP, people living in richer countries are happier than those living in poorer countries (Frey and Stutzer, 2002). The happiest nations are economically developed and relatively wealthy (Diener et al, 2015). However, this relationship is non-linear. As income continues to rise past a certain level, SWB shows diminishing marginal returns. Some evidence has indicated the relationship between income level and happiness may be concave. After around $10,000 per capita, average income has little effect on country SWB (Frey & Stutzer, 2002). Here, we are confronted with the

reverse causation problem where it is hard to say whether people are happier because they have higher incomes and can buy more to meet their needs and wants, or if they have higher incomes because they are happy and happy people have been shown to be more motivated and productive at work.

The literature on this topic points to a clear relationship between income and individual SWB. However, it is interesting to note that income level shows a weaker correlation between individual level happiness than it does on a national level. Studies show that income typically has a .1 correlation coefficient in relation to individual SWB, but the coefficient is around .5 or .6 for national SWB. There is evidence that some factors that do not affect individual-level SWB have an effect on macro-level SWB when aggregated at a higher level. For example, average education level and average IQ of cities was correlated with positive SWB, but the association between these factors and individual happiness where negligible (Stavrova, 2019).

Income inequality

Referring to psychological concepts, income inequality can result in cognitive effects that increase or decrease SWB in what was named the "relative income hypothesis" in 1949. This theory states that people look upward when making comparisons, so their aspirations are always above their current income level. One study found that people's perceived relative income had a stronger effect on predicting life satisfaction than the association between actual income and life satisfaction. Another study found that the coefficient for the "neighborhood" income effect was significant and negative. People living in wealthier communities reported lower life satisfactions than people with the same incomes living in poor neighborhoods (Cheung & Lucas, 2016). In one of the most well-known studies testing the relative income hypothesis, researchers asked participants what their choice was when faced with two income scenarios. In the first,

participants would earn an annual $50,000 while others would earn only $25,000. In the second scenario, the participants would earn $100,000 but others would earn $200,000. They found that participants were willing to give up the absolute income for relative income. 56% of participants said they would choose the first option and make more than others, even though this amount was $50,000 less than what they would earn in the second scenario (Cheung & Lucas, 2016).

The previous studies explain the effects that relative income can have on individual happiness. On a country level, the prevalence of relative income effects is linked with measures of income inequality. Cheung and Lucas (2016) hypothesized that income inequality would increase the effect of relative income by increasing the happenstance of social comparisons. They found that the association between relative income and life satisfaction was stronger in countries with higher levels of income inequality and its effects were strongest among low-income individuals. Their results suggested that greater income inequality makes discrepancies in income more pronounced, which leads to a higher instance of social comparisons. In the United States, Oishi et al. (2011) found that income inequality was correlated with a lower level of life satisfaction and explained a decrease in perceived trust and fairness in times of increased inequality. Contrarily, another study found that there is strong negative relationship between income inequality and SWB in Europe, but not in the United States where there is a more positive outlook on the potential for social mobility (Frey & Stutzer, 2002).

Interestingly, a study found that rising income equality during the Great Recession had no impact on SWB. The study was based on 25 national administrations of the European Quality of Life Survey. Despite the 6% increase in income inequality in Europe from 2003 to 2012, life satisfaction remained unchanged. The authors of this research publication contended that their results supported a utilitarian view of income that states that increasing absolute income

increases SWB and relative income effects are irrelevant. Overall, empirical research done on the topic has yielded mixed results. Throughout the 2000s the consensus on the topic was that increased income inequality reduces well-being. However, more recent research disputes this claim. Some contend that income inequality can even raise SWB in some cases (Evans et al, 2019). Further analysis should be done on this topic due to its nuanced nature.

Unemployment

Empirical research has shown that unemployment decreases SWB. However, there are surprising suggestions as to the diminishing the effects of this variable from past research. The effect of unemployment tends to have a decreasing strength of effect on country SWB when the number of people unemployed increase because, through social comparison, if one is unemployed and many more are unemployed, the perception of being unemployed is not as negative. It also depends on the strength of the social norm to work. If being employed is a highly valued aspect of the culture, unemployment will have more of a negative effect on SWB. A study on 12 European countries found that a 1% increase in the unemployment rate caused 2% of the population to shift down one point on a 5-point happiness scale with 1 being not at all satisfied to 5 being very satisfied. This finding demonstrated that the negative effect of unemployment on happiness extends past the group of people unemployed (Frey & Stutzer, 2002).

Political and Economic Freedom

The literature on personal, political, and economic freedom and happiness finds the two to be positively correlated. Economic, political, and personal freedoms are positively correlated with happiness, controlling for differences in per-capita income (Frey & Stutzer, 2002). Spruk

and Kešeljević (2016) found in their cross-national study that a higher level of economic freedom was correlated with higher levels of SWB when controlling for other factors. They used the *Heritage Foundation*'s index of economic freedom for their study, which is calculated using many indices and measurements including the regulatory environment of finance, trade openness, monetary freedom, labor freedom, and more. Inglehart et al. (2008) also found a relationship between freedom in SWB. Their study confirmed that democratization and free choice were correlated positively with SWB. In addition, Bavetta et al. (2017) found a strong correlation between amount of autonomy and free choice and happiness from a sample of 68 countries over a 30-year time period.

Inflation

A study done on 12 European countries found that a 5% increase in the inflation rate caused a 5% decrease in country SWB (Frey & Stutzer, 2002). Studies from Fraham & Pettinato (2001) and Yonas & Köhlin (2014) also found a negative relationship between inflation and SWB in both developing and developed countries. Some theorize that changing and worsening market dynamics often come at times of economic crisis and make people feel more uncertainty in their financial stability, therefore decreasing SWB.

Other Factors

Research on other factors such as education, health, institutions, and culture have indicated relationships with national SWB. There is a clear trend that show the happiest countries are often developed, and therefore have higher levels of education. There is evidence that education aggregated at the population level shows a positive correlation with SWB, despite the relationship between education at the individual level being insignificant (Stavrova, 2019).

Populations with better health (lower levels of diseases like heart disease, cancer, and diabetes) report higher levels of SWB as well as places with more generous health care coverage (Diener et al., 2015). Institutions and political regime influences SWB of a country too. Democracies are generally happier than other political systems because they act in constituent self-interest. In addition, cultural factors play a role in life satisfaction. Studies on cultural dimensions showed that individualist countries scored higher on happiness scales than collectivist countries, and high uncertainty avoidance cultures scored lower on life satisfaction (Stavrova, 2019).

Validity & Limitations to SWB Research

The validity of SWB measures has been questioned by critics, due to doubts in the reliability of self-reporting and dynamic nature of human affect. However, people have answered SWB surveys consistently across their lifetime and although moods are likely to differ across short periods of time, reporting on life evaluation has been stable (Diener et al., 2013). Researchers found that 60-80% of variance is due to long-term factors, for example, personality. The remaining 20-40% of variance is attributed to occasion-specific circumstances and error of measurement (Diener et al., 2013).

Though SWB measures have shown to be stable and reliable over time, the question remains: how valid is the comparison of SWB measures between countries? There is no consensus on the degree of differences between different cultures' sources of happiness, but psychology studies have shown a difference in perspectives on happiness between North American, European, and East Asian groups (Stavrova, 2019). Krueger and Stone (2014) suggest a vignetted approach where respondents are gauged on intensity scale of whatever construct they are self-reporting answers for. This approach would be used within a framework where SWB is assessed by answering questions on different, non-overlapping dimensions that

can be added up to an aggregate measure of SWB. This idea is alike to GDP, where if something is taken away from one dimension, it is applied to another. The powers different groups assign to these dimensions could teach us more about how happiness is viewed differently across countries (Krueger & Stone, 2014).

In addition to issues with cross-cultural validity, typical statistical problems arise when measuring SWB including possible collinearity of factors and addressing the possibility of reverse causation. The interconnectedness of factors affecting country SWB are difficult to isolate. For example, wealthy nations score high on political freedom, civil rights, good governance, low crime rates, and low social inequality (Stavrova, 2019). Do these factors influence each other? It is also difficult to definitively say whether certain factors influence Swb or SWB influences certain factors. Does democracy lead to more happiness or does higher happiness result in more democratic values? Fortunately, we have statistical methods of analyzing the extent of collinearity and can determine the direction of causation through the different tests when using mathematical models to determine the relationship between certain socioeconomic factors and SWB.

Theoretical Arguments

Veenhoven and Ehrhardt (1995) took psychological and sociological concepts used to explain SWB on an individual level and applied them to cross-national frameworks for SWB. The first theory on national SWB Veenhoven and Ehrhardt discuss is livability theory. In their study, livability theory was the best predictor of happiness and states that life satisfaction depends on the objective quality of life. The more enjoyable it is to live in the country, the happier the people. This theory is interesting because its explanation lies in absolute terms, rather than incorporating relativity.

The other theory they presented is called, which says that evaluation of life is based on a cognitive assessment in which what-life-is is judged against what-life-should-be. This can come from social comparison with compatriots or lifetime comparison, where an individual judges their satisfaction with life based on their best and worse experiences. According to this theory, all country's happiness levels should be relatively neutral, with those engaging in upward comparisons and those engaging in downward comparisons essentially cancelling each other out (Veenhoven and Ehrhardt, 1995). Two other closely related theories, adaptation level theory and evolutionary modernization theory, incorporate these cognitive processes to explain why happiness does not rise with income over time.

Livability theory

Livability theory is regarded as the "common sense" theory of happiness that says improvements of living conditions of a society will make increase SWB. Unlike comparison theory, livability theory approaches happiness with an objective perspective and focuses on quality of life in absolute terms, not relative. Conditions of the environment are ecological and societal. It supports the idea that there are universal human needs. This theory was the most widely accepted until rich Western countries started showing a tapering off of happiness levels despite increased wealth, when the Easterlin paradox entered the discussion on country happiness. Livability theory predicts that happiness will vary across countries and be lower in countries with poor living conditions and higher in countries with favorable living conditions (Veenhoven & Ehrhart, 1995).

According to this theory, money can fulfill basic and idiosyncratic needs and thus is theorized to have a direct effect on satisfaction people experience (Cheung & Lucas, 2016). We see the proof of this thinking in the literature, which show that richer people are often happier

than poorer people within countries and richer countries are generally happier than poorer countries across the world. This makes sense, as higher absolute income gives people and countries more utility in terms of spending and consumption. As Diener et al. (2015) put it, "the association between national income and well-being is likely because of the fact that people's basic needs and desires are met to a larger extent when they live in rich nations." As mentioned previously, on an individual level, the ability for people to achieve their goals accounts for nearly half of individual-level happiness by satisfying human desire to gradually reach goals (Stavrova, 2019). On a country level, we see evidence of this through multiple cross-national studies. The strength of the positive correlation between absolute income and happiness is strongest in developing countries, where income is lower and education level is below average (Cheung & Lucas, 2016).

Comparison theory

Comparison theory has its roots in psychology and was first described by Festinger (1954) as a socio-psychological process in which individuals strive for self-evaluation derived from a comparison to others. Comparison theory is thought of as being an inherent characteristic of the psychological human experience. The earlier definition of the theory stated that people use objective and nonsocial standards when evaluating themselves but engage in comparisons when objective information is unavailable. This definition of social comparison theory has evolved to suggest that individuals are not purely objective in any circumstances of self-evaluation. They are biased and striving towards an accurate self-perception through the process of relating their own characteristics to the characteristics of others. In addition to social comparisons, comparison theory also includes people's comparisons of their past experiences to their present experience and expectation for their future experience, known as lifetime comparisons. Some sociologists

suggest that this process is an adaptive technique where one can evaluate competitors, identify areas for self-improvement, and enhance self-esteem (Dijkstra et al., 2010).

Social comparison theory can be seen in relative income effects on happiness mentioned in the literature review. Cheung and Lucas (2016) found that relative income has just as much or more of an effect on SWB as absolute income. Based on their findings, higher levels of income inequality make discrepancies more noticeable, and result in higher levels of social comparison. Social comparison theory also explains why the negative effects of unemployment on country SWB weaken as the unemployment rate rises (Frey & Stutzer, 2002).

Following the assumptions that people's reference behaviors are random and top-down or bottom-up, positive, and negative comparisons are expected to be equally distributed across a population. Therefore, average happiness should be neutral with little variation among countries. However, the expectation of this theory is limited by its assumptions. For example, if there is, in fact, a higher instance of upward comparisons occurring in a population, average happiness will be lower. A non-neutral average of happiness could only be explained by another premise about reference behaviors occurring in the population (Veenhoven & Ehrhart, 1995).

According to the closely related adaption-level theory, happiness is determined by the gap between aspiration and achievement. In other words, people are determining their satisfaction with life based on the gap between what they want and what they have and are often disappointed in the little gains to happiness when their goals are reached over time. Higher utility from gaining material things eventually wears off. Therefore, they set new goals hoping that achieving a higher goal will satisfy them and the dissatisfaction gap between what they have and what they want remains the same distance but shifts upward. Similarly, comparison theory on national SWB states evaluation of life is based on a "mental calculus, in which perceptions of

reality are judged against a perception of life should be," (Veenhoven & Ehrhart, 1995). Easterlin (1974) suggested that a rise in country income will not result in an increase in happiness after a certain point due to a shift in reference points for social comparison across the population. As income rises, people's aspirations shift as well but the gap between their goals and actual position does not change, therefore, happiness levels do not change except for those who experience above-average financial gain.

Evolutionary Modernization theory, proposed by Inglehart, explains country-level lifetime comparisons. It says that people's values change as they move from subsistence-level scarcity to high levels of security and when a country develops, values change from survival values to more emancipated values. This explains why developing countries derive more utility from an increase in absolute income than developed countries. Developing countries can use this money to meet immediate needs for safety and security, while more developed nations are focused on aspects of life that cannot necessarily be bought with money, like decreasing corruption or improving the efficiency of the healthcare system (Diener et al., 2013).

Methodology

The sample consists of data from 90 countries for the year 2017. If data for 2017 was unavailable, the closest year of data was used instead. Data was collected for independent variables including income inequality, income level, unemployment, health, freedom, and inflation and for the dependent variable, national SWB. A multiple regression analysis was performed and the results were examined using statistical analysis.

Data for income level, income inequality, unemployment, health, and inflation were taken from the World Bank's World Development Indicators Databank (n.d.). Income level was

measured using GNI per capita, PPP (constant 2017 international $), which was transformed using natural log to decrease variability in the data. For income inequality, the Gini Index was used with 0 representing perfect equality and 100 representing perfect inequality. Unemployment was measured using the unemployment rate, the percent of the total labor force unemployed from a national estimate. Health was represented by total years of life expectancy at birth. Education was represented by expected years of schooling from the Human Capital Index and inflation was measured with the CPI index.

Freedom was measured using data from the Human Freedom Index (HFI). The HFI is calculated using third-party survey data about economic and personal freedom. It considers 79 indicators ranging from rule of law to religion to access to sound money. The HFI ranges on a scale of 0 to 10 with 10 representing the more freedom. Subjective well-being was taken from the World Happiness Report. It is represented by the average score of life satisfaction from the Gallup World Poll survey and is measured using the Cantril ladder scale, which asks respondents to think of a ladder with the best possible life for them being a 10 and the worst being a 0. The data for each variable was compared on a correlation matrix and ultimately, education and life expectancy were eliminated due to high collinearity with GNI per capita, HFI, and each other.

Correlation Matrix

	gni_pc	*gini*	*unemp*	*hfi*	*life_exp*	*exp_ed*	*infl*
gni_pc	1						
gini	-0.40896	1					
unemp	-0.15724	0.227782	1				
hfi	0.723311	-0.29483	-0.07608	1			
life_exp	0.853519	-0.40017	-0.13044	0.658495	1		
exp_ed	0.826521	-0.4157	-0.23172	0.590419	0.815283	1	
infl	-0.44747	0.085809	0.188854	-0.57588	-0.49083	-0.41776	1

The multiple regression model applied to this study can be written as follows:

$$swb = \alpha_0 + \beta_1(gini) + \beta_2(gni\_pc) + \beta_3(unemp) + \beta_4(hfi) + \beta_5(infl) + e$$

where . . .

swb = National subjective well-being

gini =Gini index

gni_pc = GNI per capita

unemp = Unemployment rate

hfi = HFI

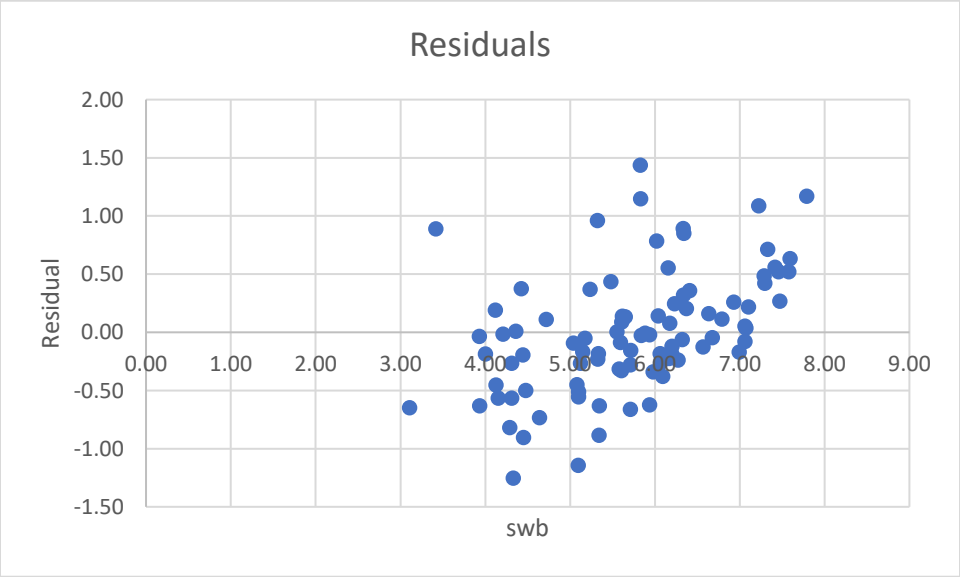
infl = Inflation rate

e = error term

Results

The results were analyzed using basic statistical analysis procedure. A p-value of less than .05 and a t stat of less than +/- were used to determined statistical significance at the 95% confidence level. The R^2 value of this study was .76, indicating a moderately strong correlation between all the included independent variables and SWB. This value suggests the resulting model is relatively good at predicting SWB if given data for inequality, income level, unemployment, and freedom. However, judging by the residual plot, the model tended to over-estimate SWB for countries that reported higher SWB and under-estimated SWB for countries with lower SWB. The regression analysis provided an intercept of -2.22 which was significantly significant having a p-value of 0.018 and indicates that a large amount of variability in SWB is due to independent factors other than the ones used in this study. Independent variables that were found to be statistically significant include income level, unemployment, and freedom.

Residual Plot



Summary Statistics

	gni_pc	*gini*	*unemp*	*hfi*	*infl*	*swb*
Mean	9.68	36.98	7.85	7.31	4.03	5.72
Standard Error	0.10	0.80	0.57	0.10	0.45	0.11
Median	9.81	35.90	5.99	7.38	2.84	5.77
Standard Deviation	0.99	7.55	5.45	0.96	4.27	1.07
Range	4.27	34.90	27.84	4.29	30.49	4.68
Minimum	6.92	24.20	0.83	4.53	-0.98	3.11
Maximum	11.19	59.10	28.67	8.82	29.51	7.79

Regression Analysis

Regression Statistics	
Multiple R	0.87
R Square	0.76
Adjusted R Square	0.75
Standard Error	0.54
Observations	90.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	5.00	78.54	15.71	54.43	0.00
Residual	84.00	24.24	0.29		
Total	89.00	102.78			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-2.22	0.92	-2.42	0.018
gni_pc	0.62	0.09	7.09	0.000
gini	0.01	0.01	1.48	0.142
unemp	-0.06	0.01	-5.38	0.000
hfi	0.28	0.10	2.89	0.005
infl	-0.02	0.02	-1.14	0.259

The actual GNI per capita for each country ranged from $1,012 to $72,646 with a mean of $23,393 and standard deviation of $18,168. Transformed data for the natural log of GNI per capita ranged from 6.9 to 4.3 with a mean of 9.7 and standard deviation of 1. Data for income inequality measured with the GINI coefficient ranged from 24.2 to 59.1 and the mean was 37.0 with a standard deviation of 7.5. The unemployment rate for this sample varied from 0.8% to 29% with a mean of 7.9% and standard deviation of 5.5%. The Human Freedom Index entries ranged from 4.5 to 8.8 with a mean of 7.3 and standard deviation of 1. Inflation ranged from -1% to 30% and had a mean of 4% with a standard deviation of 4.3%. SWB was measured using the life satisfaction Cantril ladder scale ranged from 3.1 to 7.8 with a mean of 5.7 and standard deviation of 1.1.

As expected, income level was found to be statistically significant at a p-value of 0 and positive coefficient of .62, meaning that a 1 unit increase in the natural log of GNI per capita is associated with a .62 rise in SWB. Income inequality was found to be statistically insignificant

with a p-value of .14 and a coefficient of positive .01, meaning that for every 1-point increase in the GINI coefficient, SWB increases by .01 points. The unemployment rate was also found to be statistically significant with a p-value of 0 and coefficient of -0.06, meaning a 1% increase in the unemployment rate is associated with a drop in SWB of .06 points. Finally, freedom was found to be statistically significant with a p-value of .005 and coefficient of positive .28. A 1-point increase toward more freedom is associated with a .28 increase in SWB. Finally, inflation was found to be insignificant with a p-value of .26 and coefficient of -0.02, meaning that an increase in 1% inflation is correlated with a decrease in SWB by .02 points.

Discussion

As expected, the results of this study revealed other statistically significant variables in addition to income level on national SWB including unemployment and freedom. Income inequality and inflation, however, were not found to have a strong relationship with national SWB. The results of this study follow the predictions of livability theory, which states that countries with better living conditions will have higher levels of SWB. According to this theory, high income and other factors that contribute to safer, more enjoyable living conditions in countries will have a positive relationship with SWB and factors that livability of country, for example, high unemployment, will decrease SWB, as demonstrated by the results of the study. Income level and personal and economic freedom were both found to have positive correlations with national SWB, while the unemployment rate was found to have a negative relationship with national SWB.

One of the limitations to this study was the use of a multiple linear regression model, which assumes a linear relationship between all independent variables and the dependent variables. In future research, a different type of model may be preferable to depict non-linear

relationship more accurately between the independent variables and SWB that may exist. Also, the sample used was limited to only countries who participated in the data collection of the variables that were used in this study. Many very small countries or countries that did not wish to report (i.e., North Korea) were excluded. In addition, there was a challenge with collinearity of variables, leading some indictors from being included in the regression model. More international consensus on measures of freedom, SWB, and other social indictors may lead to more valid studies that can more reliably compare SWB and its sources in cross-national studies.

Future research may include longitudinal cross-national studies to uncover more information about the resolution of the Easterlin paradox. This may give us more insight into the validity of comparison theory, adaption theory, and evolutionary modernization theory. Also, there are many other factors, especially social factors, that are more difficult to measure but may give a more holistic understanding of different sources of SWB, such as social capital. Another interesting area of study in national SWB research would be comparisons of developing countries and developed countries. Developed countries show diminishing marginal returns once GNI per capita reaches a certain level, so understanding the strength of other variables past this point may give richer nations a better idea as to how to raise happiness levels in their countries through policy decision-making.

Conclusion

The findings from this study support the trend in SWB economic research that contends that income level is not the most comprehensive assessment of quality of life in a country due to the influence of other factors on SWB. Policy makers should consider these other relevant factors and their effects on SWB to form a happier, healthier society. Though absolute income has been shown to have an unwavering positive correlation with SWB, as the Easterlin paradox

demonstrates, income alone is not enough to form an aggregate measure of SWB. As we have learned through subsequent research and the results of this study, other macroeconomic forces indicate a relationship with national SWB.

Appendix

Table 1.1 Sample Data

Country	**gni_pc**	**gini**	**unemp**	**hfi**	**infl**	**life_exp**	**exp_ed**	**swb**
Finland	10.77	27.40	8.64	8.49	0.754	81.63	13.75	7.79
Denmark	10.94	28.70	5.83	8.73	1.147	81.10	13.45	7.59
Norway	11.11	27.00	4.16	8.45	1.875	82.61	13.7	7.58
Switzerland	11.09	32.70	4.80	8.82	0.534	83.55	13.29	7.47
Netherlands	10.93	28.50	4.84	8.48	1.381	81.76	13.82	7.46
Canada	10.78	33.30	6.34	8.64	1.597	81.95	13.67	7.41
Israel	10.57	39.00	4.22	7.44	0.244	82.55	13.76	7.33
Austria	10.89	29.70	5.50	8.45	2.081	81.64	13.89	7.29
Sweden	10.88	28.80	6.72	8.52	1.794	82.41	13.89	7.29
Costa Rica	9.84	48.30	8.14	7.84	1.626	79.91	12.48	7.23
United Kingdom	10.72	34.80	4.33	8.44	2.558	81.26	13.89	7.10
Germany	10.90	31.90	3.75	8.52	1.509	80.99	13.89	7.07
Luxembourg	11.19	34.90	5.52	8.49	1.731	82.10	12.4	7.06
Ireland	11.03	32.80	6.71	8.62	0.341	82.16	13.71	7.06
United States	11.02	41.40	4.36	8.44	2.130	78.54	13.32	6.99
Belgium	10.84	27.40	7.09	8.28	2.126	81.49	13.41	6.93
Czech Republic	10.51	24.90	2.89	8.29	2.451	78.98	13.94	6.79
Malta	10.55	29.20	4.00	8.33	1.364	82.35	13.28	6.68
France	10.73	31.60	9.40	8.05	1.032	82.58	13.96	6.64

Panama	10.26	49.90	3.90	7.87	0.876	78.15	11.34	6.57
Mexico	9.87	46.30	3.42	6.85	6.041	74.95	12.57	6.41
Slovak Republic	10.30	25.20	8.13	7.95	1.312	77.17	12.97	6.37
El Salvador	8.99	38.00	4.39	7.03	1.012	72.87	11.31	6.34
Uruguay	9.91	39.50	7.89	7.92	6.218	77.63	11.78	6.34
Brazil	9.56	53.30	12.82	6.83	3.446	75.46	11.69	6.33
Chile	10.07	44.40	6.96	8.18	2.183	79.91	12.85	6.32
Lithuania	10.39	37.30	7.07	8.37	3.723	75.48	13.59	6.27
Spain	10.59	34.70	17.22	8.2	1.956	83.28	13.11	6.23
Poland	10.27	29.70	4.89	7.72	2.076	77.75	13.2	6.20
Italy	10.64	35.90	11.21	8.12	1.227	82.95	13.58	6.20
Mauritius	10.07	36.80	6.75	7.55	3.667	74.51	12.5	6.17
Slovenia	10.49	24.20	6.56	8.05	1.429	81.03	13.64	6.17
Colombia	9.54	49.70	8.87	6.85	4.312	76.93	12.48	6.16
Romania	10.20	36.00	4.93	8.09	1.339	75.31	12.17	6.09
Hungary	10.25	30.60	4.16	7.61	2.348	75.82	13.01	6.07
Cyprus	10.51	31.40	11.05	8.05	0.532	80.67	13.52	6.06
Argentina	10.04	41.20	8.35	7.05	4.020	76.37	13.07	6.04
Honduras	8.56	50.50	5.53	6.94	3.934	74.90	9.98	6.02
Latvia	10.26	35.60	8.72	8.34	2.930	74.63	13.28	5.98
Thailand	9.72	36.50	0.83	6.37	0.666	76.68	12.37	5.94
Estonia	10.41	30.40	5.76	8.54	3.417	78.09	13.1	5.94
Kazakhstan	10.01	27.50	4.90	6.99	4.020	72.95	13.34	5.88

Ecuador	9.34	44.70	3.84	7.14	0.417	76.58	13.18	5.84
Pakistan	8.41	33.50	3.57	5.64	4.085	66.95	8.83	5.83
Tajikistan	8.19	34.00	6.90	5.77	4.020	70.65	10.79	5.83
Paraguay	9.41	48.80	4.61	7.19	3.602	73.99	11.52	5.71
Portugal	10.39	33.80	8.87	8.27	1.369	81.42	13.78	5.71
Peru	9.39	43.30	3.69	7.68	2.803	76.29	12.72	5.71
Bolivia	9.01	44.00	3.65	6.78	2.823	70.95	12.02	5.65
Montenegro	9.91	39.00	16.07	7.46	2.380	76.67	12.36	5.61
Turkey	10.23	41.40	10.82	6.27	11.144	77.16	12.12	5.61
Dominican Republic	9.68	42.20	5.83	7.37	3.280	73.69	11.29	5.61
Philippines	9.11	44.40	2.55	6.9	2.853	70.95	12.8	5.59
Russian Federation	10.14	37.20	5.21	6.31	3.683	72.43	13.83	5.58
Belarus	9.77	25.40	5.65	6.67	6.032	74.13	12.02	5.55
Ghana	8.49	43.50	4.22	7.04	12.372	63.46	11.6	5.48
Croatia	10.18	30.40	11.21	7.92	1.129	77.83	13.31	5.34
Malaysia	10.16	41.00	3.41	6.9	3.871	75.83	12.16	5.34
Mongolia	9.18	32.30	6.36	7.61	4.311	69.51	13.59	5.33
Moldova	9.42	25.90	4.10	7.18	6.570	71.72	11.78	5.33
Nigeria	8.52	35.10	8.39	6.05	16.524	53.95	8.18	5.32
North Macedonia	9.62	34.20	22.38	7.4	1.352	75.59	11.17	5.23

Vietnam	8.80	35.30	1.87	6.25	3.520	75.24	12.3	5.18
Greece	10.26	34.40	21.49	7.38	1.121	81.29	12.88	5.15
Serbia	9.65	36.20	13.48	7.34	3.131	75.54	13.37	5.12
China	9.57	38.50	3.90	6.07	1.593	76.47	13.25	5.10
Indonesia	9.27	38.10	3.88	7.07	3.809	71.28	12.31	5.10
Bulgaria	9.95	40.40	6.16	7.93	2.064	74.81	12.92	5.10
Bhutan	9.23	37.40	2.45	6.52	4.955	71.13	12.02	5.08
Cote d'Ivoire	8.45	41.50	3.27	6.51	0.686	57.02	7.04	5.04
Iran, Islamic Rep.	9.59	40.80	12.23	4.53	8.045	76.27	11.68	4.72
Albania	9.46	33.20	13.62	7.81	1.987	78.33	12.99	4.64
Kenya	8.29	40.80	2.76	6.75	8.006	65.91	10.7	4.48
Georgia	9.47	37.90	13.94	7.87	6.035	73.41	12.48	4.45
Namibia	9.20	59.10	23.35	6.92	6.146	63.02	8.94	4.44
Liberia	7.23	35.30	3.08	6.4	12.420	63.30	4.41	4.42
Togo	7.33	43.10	3.74	6.13	-0.980	60.49	9.07	4.36
Sri Lanka	9.41	39.80	4.05	6.72	7.704	76.65	12.97	4.33
Ukraine	9.40	26.00	9.50	6.45	14.438	71.78	13.01	4.31
Bangladesh	8.38	32.40	4.37	5.67	5.702	72.05	11.03	4.31
Armenia	9.44	33.60	17.70	7.69	0.970	74.80	11.09	4.29
Eswatini	8.97	54.60	22.72	6.02	6.221	58.32	8.15	4.21
Myanmar	8.43	30.70	1.56	5.45	4.573	66.56	9.85	4.15
Tunisia	9.24	32.80	15.33	6.04	5.309	76.31	10.2	4.12

Gambia, The	7.62	35.90	10.16	6.27	8.034	61.44	8.96	4.12
Uganda	7.61	42.80	9.44	6.58	5.641	62.52	7	4.00
Zambia	8.11	57.10	11.63	6.71	6.577	63.04	9.15	3.93
Egypt, Arab Rep.	9.29	31.50	11.74	4.67	29.507	71.66	11.13	3.93
Malawi	6.92	44.70	28.67	6.57	11.543	63.28	9.37	3.42
Rwanda	7.57	43.70	17.36	6.97	8.280	68.34	6.55	3.11

Figure 2.1 Income Level and SWB Scatterplot

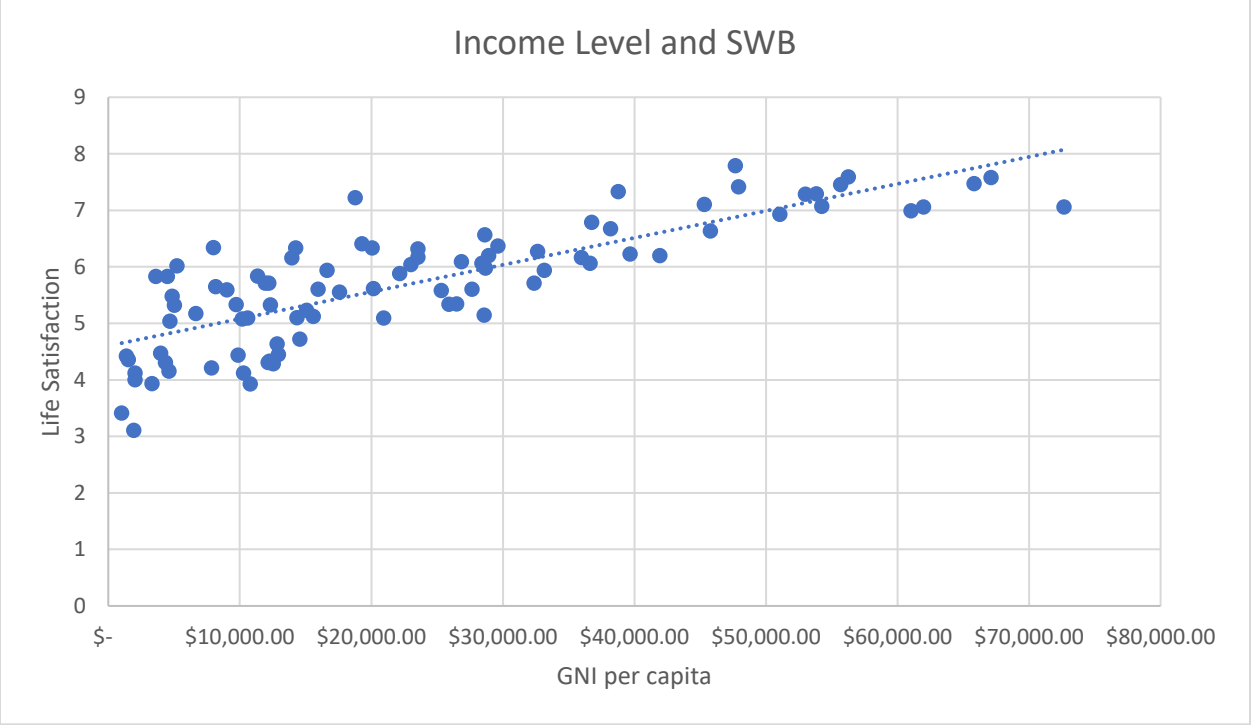


Figure 2.2 Income Inequality and SWB Scatterplot

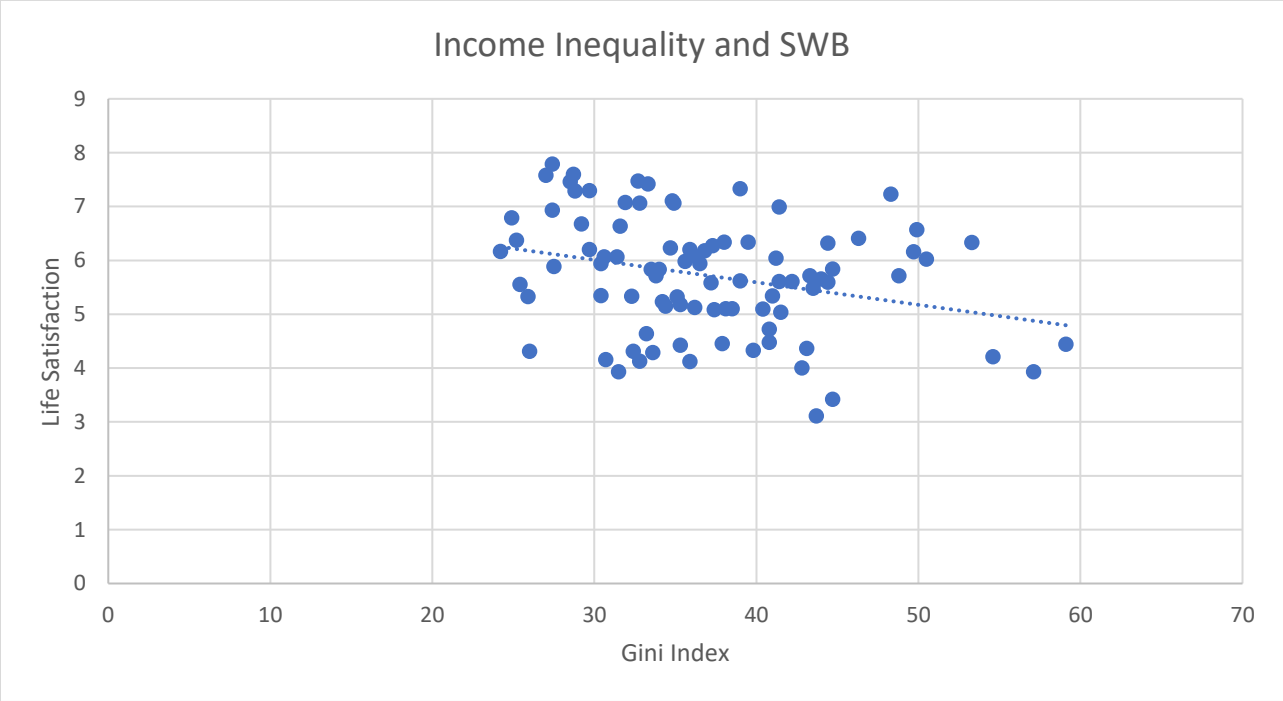


Figure 2.3 Unemployment and SWB Scatterplot

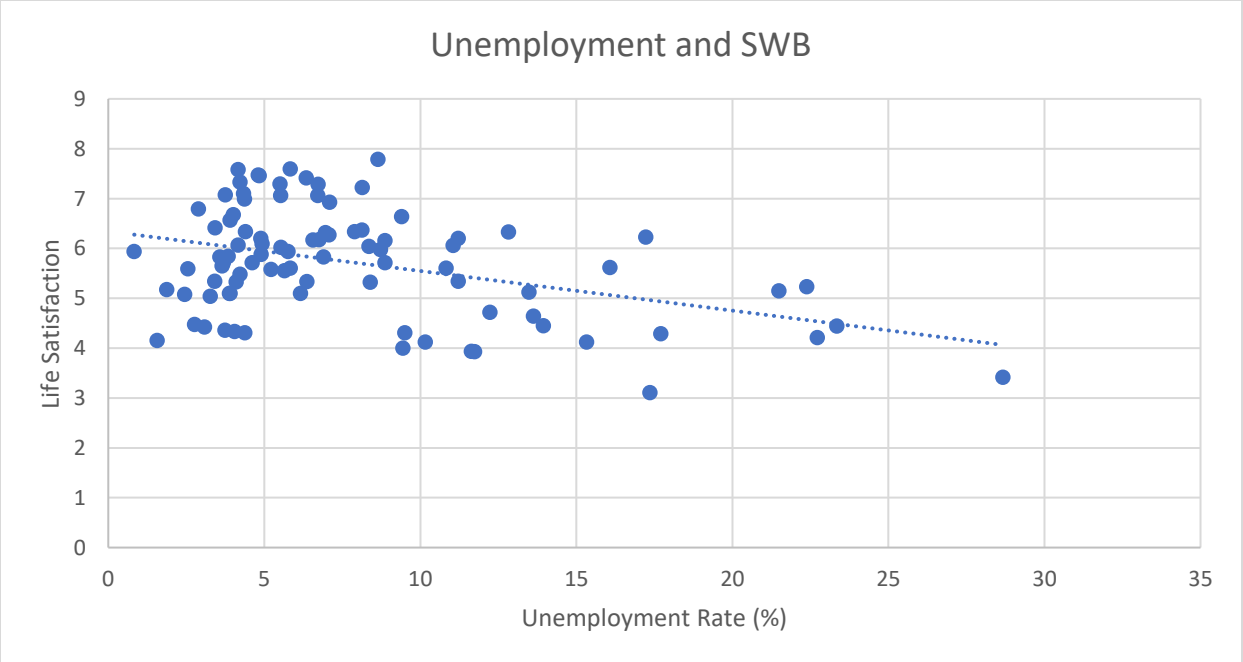


Figure 2.4 Freedom and SWB Scatterplot

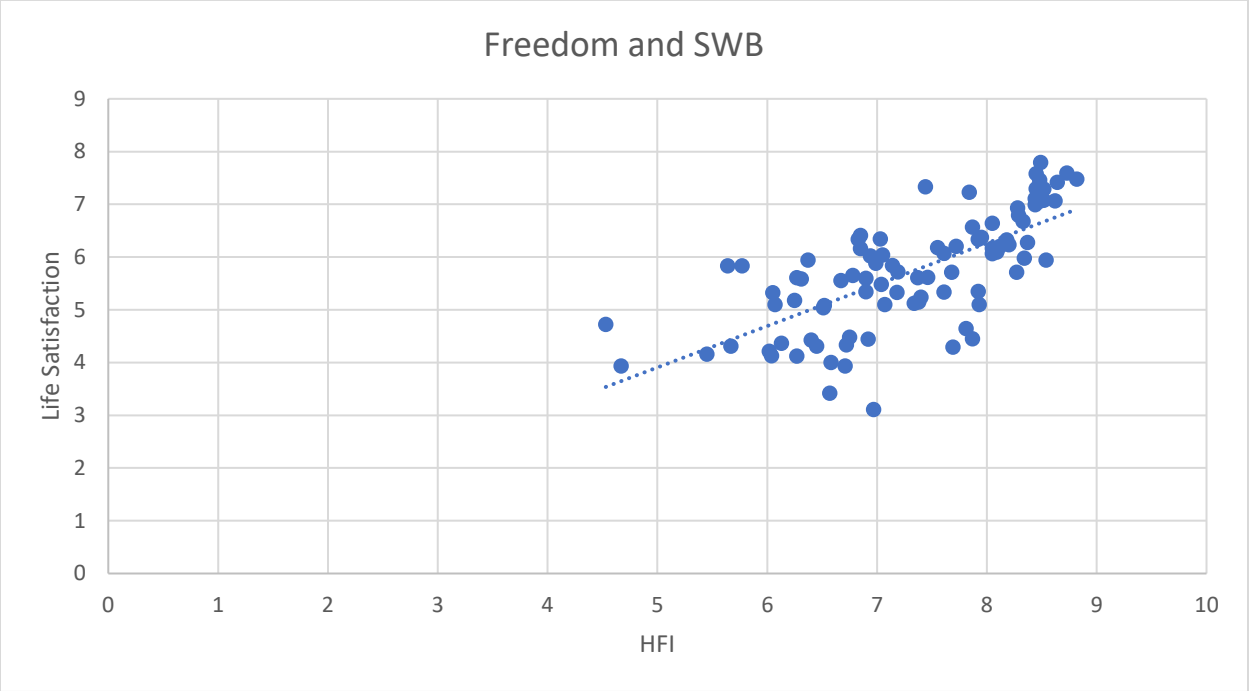
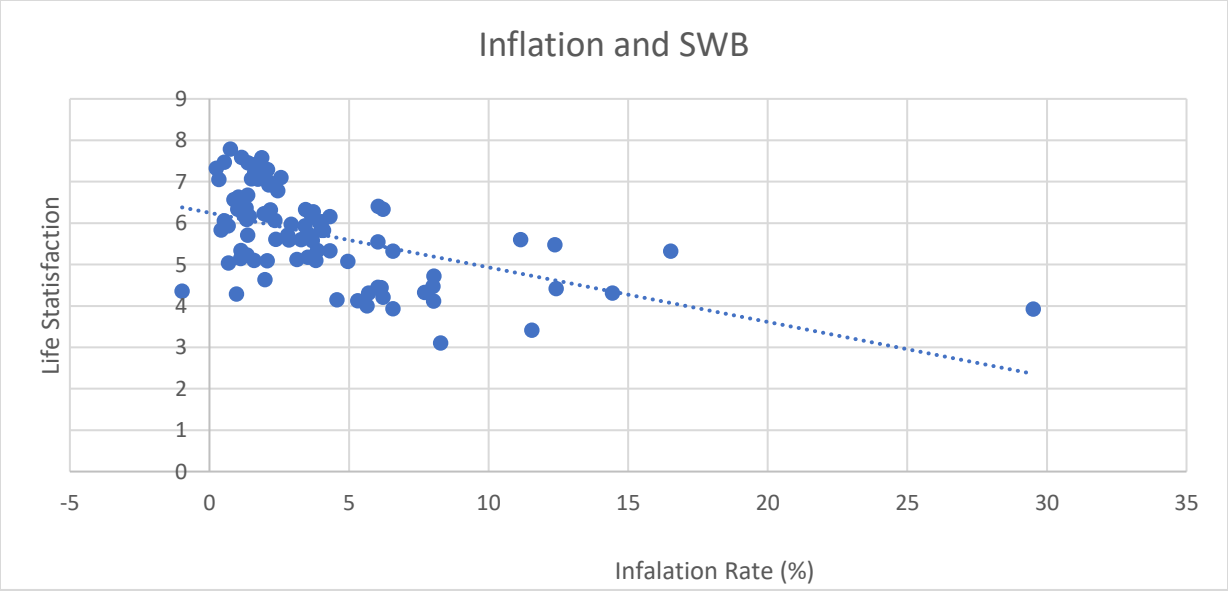


Figure 2.5 Inflation and SWB Scatterplot



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